

ADAPTIVE SELF-REGULATING SYSTEM FOR LOAD CONTROL OF AUTOGENOUS MILLS

Introduction. The emergence and development of modern means of information processing makes it possible to implement effective multi-level systems of automatic management of technological processes of enrichment technology, in which the object of management is the entire technological line.

Research problem. The purpose of controlling the local system of Figure 1 – to ensure, by adjusting the frequency of rotation of the feeder blade V , the stabilization of the degree of filling of the mill φ at the level of the task φ_{val} , the value of which is determined at the top level of the hierarchy [2].

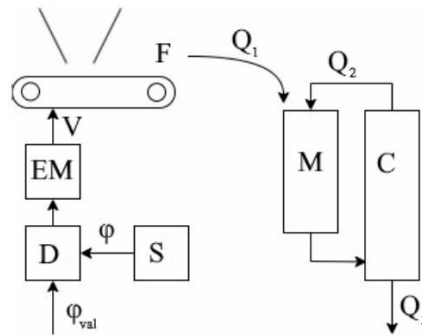


Figure 1 - Control system for the degree of filling of a self-grinding mill:

M – autogenous mill, C – classifier, S – mill filling sensor, F – feeder, D – computing device, EM – executive mechanism, Q_1, Q_2, Q_3 – respectively, flows of initial ore, reversible loading and finished product

As an object of control, a self-crushing mill with a classifier along the channel «feeder blade speed V - degree of drum filling φ » is described with sufficient accuracy by the transfer function:

$$W_{OC} = \frac{K}{T_2^2 p^2 + T_1 p + 1}. \quad (1)$$

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The main task of our research is the degree of filling φ is complicated by the fact that the self-grinding drum mill is essentially an inertial and non-stationary object - the parameters of the transfer function (1), such as K, T_1, T_2 , as change in a fairly wide range (up to 15% of nominal values). The main reason for the drift of the model parameters is a change in the physical and mechanical properties of the original ore sent for grinding.

In addition to affecting the transmission coefficient K , these disturbances can qualitatively change the structure of the object (1), which acquires the properties of value $T_1 < 2T_2$ an oscillating link

To solve the problem of adapting the system to the physical and mechanical properties of the original ore, which change and cause changes in the values of the model parameters of the control object K, T_1, T_2 it is advisable to use a self-adjusting system with an adjustable model [1].

Calculation of processes in the adaptive system was performed by the methods Δt . Finally, an adaptive system is proposed to control the loading process of self-grinding mills, which provides the specified characteristics of transient processes in the main control circuit in conditions of non-stationarity of the object [3].

Conclusion. As a result of modeling the processes in the adaptive system, it is established that setting its parameters ends much faster [4] than changing the parameters of the control object.

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